

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

## PCT

### WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:  
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Date of mailing  
(day/month/year) **07 JUL 2005**

Applicant's or agent's file reference

**FOR FURTHER ACTION**

See paragraph 2 below

7040-X05-065PCT

International application No.

International filing date (day/month/year)

Priority date (day/month/year)

PCT/US05/05715

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International Patent Classification (IPC) or both national classification and IPC

IPC(7): G06K 9/34, 9/62, 9/68, 9/60; G06F 7/00; G06N 5/02; G03B 19/18; H04N 5/228, 5/232; G05B 15/00 and US Cl.: 382/173, 175, 178, 209, 225, 226, 227, 228, 305, 306; 707/6, 102, 103R, 103Y; 706/48; 352/39

Applicant

YEDA RESEARCH & DEVELOPMENT CO., LTD.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

#### 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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Box No. 1 Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This opinion has been established on the basis of a translation from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

☐ a sequence listing

☐ table(s) related to the sequence listing

b. format of material

☐ in written format

☐ in computer readable form

c. time of filing/furnishing

☐ contained in international application as filed.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

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Box No. V Reasoned statement under Rule 43 bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims <u>39-62</u>	YES
	Claims <u>1-38</u>	NO
Inventive step (IS)	Claims <u>39-62</u>	YES
	Claims <u>1-38</u>	NO
Industrial applicability (IA)	Claims <u>1-62</u>	YES
	Claims <u>NONE</u>	NO

2. Citations and explanations:

Please See Continuation Sheet

Claims 39-62 meet the criteria set out in PCT Article 33(2)-(3), because the prior art specifically Kalend et al. (US 5,784,431) does not teach or fairly suggest subjecting two images to segmentation by weighted aggregation of claims 39, 40, 43, 45 and assigning a weight to each pair of neighboring pixels according to a normalized correlation between their motion profiles of claims 47, 48, 55 and 56 combined with other features and elements of the claims.

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the questions whether the claims are fully supported by the description, are made:

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

V. 2. Citations and Explanations:

Claims 1-38 lack novelty under PCT Article 33(2) as being anticipated by Brandt et al. (US 20040013305).

Regarding claim 1, Brandt teaches, a method for clustering data comprising the steps of a. constructing a graph of a database in which each node of the graph represents a component part of the database and every two nodes represent neighboring component parts associated by an arc representing a coupling value (Paragraph 28, Lines 1-6), b. selecting chosen component parts as blocks with unselected neighboring component parts coupled with a selected block according to coupling values (Paragraph 178, Lines 5-9), c. coarsening the graph by performing iterated weighted -aggregation wherein at each iteration of the coarsening blocks are selected and coupling values updated between unselected blocks to form larger blocks to obtain hierarchical decomposition of the database and to form a pyramid structure (Paragraph 178, Lines 9-12), d. adjusting the coupling between blocks (Paragraph 178, Lines 12-17) e. detecting saliency of segments in the pyramidal structure (Paragraph 178, Lines 17-18), f. determining which component parts belong to a segment by computing recursively a degree of attachment of every component part to each of the blocks in the pyramid (Paragraph 75, Lines 7-12), and g. scanning the pyramid from coarse to fines starting at the level a segment is detected and applying relaxation sweeps to sharpen the boundaries of a segment (Paragraph 75, Lines 12-8);

Brandt teaches limitation of claim 2, a method for processing an image comprising the steps of a. constructing a graph of an image in which each node of the graph represents a pixel of the image, and every two nodes represent neighboring pixels associated by an arc representing a coupling value (Paragraph 28, Lines 1-6), b. selecting chosen pixels as blocks with unselected neighboring pixels coupled with a selected block according to coupling values (Paragraph 178, Lines 5-9), c. coarsening the graph by performing iterated weighted aggregation wherein at each iteration of the coarsening blocks are selected and coupling values updated between unselected blocks to form larger blocks to obtain hierarchical decomposition of the database and to form a pyramid structure (Paragraph 178, Lines 9-12), d. adjusting the coupling between blocks (Paragraph 178, Lines 12-17), e. detecting saliency of segments in the pyramidal structure (Paragraph 178, Lines 17-18), f. determining which pixels belong to a segment by computing recursively a degree of attachment of every pixel to each of the blocks in

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

the pyramid (Paragraph 75, Lines 7-12), and g. scanning the pyramid from coarse to fine starting at the level a segment is detected and applying relaxation sweeps to sharpen the boundaries of a segment (Paragraph 75, Lines 12-8);

Brandt teaches limitation of claim 3, a method for processing an image comprising the steps of a. constructing a graph of an image in which each node of the graph represents a pixel of the image, every edge connects a pair of neighboring pixels and a weight is associated with each edge reflecting contrast in the corresponding location in the image (Paragraph 108, Lines 1-7), b. selecting some pixels as blocks and associating unselected neighboring pixels with a selected block to form aggregates (Paragraph 178, Lines 5-9), c. detecting segments by a recursive coarsening using weighted aggregation which induces a pyramid structure over the image, the segments detected appearing as an aggregate at some level in the pyramid (Paragraph 108, Lines 7-11), d. said recursive coarsening comprising iterated weighted aggregation wherein at each iteration of the coarsening blocks are selected and weights are updated between unselected blocks to form larger blocks to obtain hierarchical decomposition of the image into aggregates (Paragraph 72 through 74), e. determining salient segments from among the segments detected in the pyramidal structure (Paragraph 75, Lines 1-4), and f. sharpening the segments to determine its boundaries more accurately (Paragraph 75, Lines 12-15);

Brandt teaches limitation of claim 4, the method including the further step of determining which pixels belong to a segment by computing recursively a degree of attachment of every pixel to each of the blocks in the pyramid (Paragraph 75, Lines 6-8);

Brandt teaches limitation of claim 5, the method including the further step of scanning the pyramid from coarse to fine starting at the level a segment is detected and applying relaxation sweeps to sharpen the boundaries of a segment (Paragraph 75, Lines 12-16);

Brandt teaches limitation of claim 6, the method including the further step of computing at least one property of the aggregate it represents during recursive coarsening for every block in a new level of the pyramid (Paragraph 103, Lines 16-18);

Brandt teaches limitation of claim 7, the method including the further step of updating weights to account for properties computed during recursive coarsening for every edge in the graph (Paragraph 128, Lines 14-15);

Brandt teaches limitation of claim 8, the method including the further step of updating weights during cursive coarsening to increase weights between neighboring aggregates exhibiting sharp sections that connect by a smooth curve (Paragraph 155);

Brandt teaches limitation of claim 9, the method including the further step of applying a topdown sharpening during the recursive coarsening at any given level by first going down a preselected number of levels to check the boundaries of detected segments, updating weights, and rebuilding the pyramid to the originating level to sharpen distinction between aggregates before building the pyramid to the next upper level (Paragraph 159, Lines 1-6);

Brandt teaches limitation of claim 10, the method including the further step of going back down a preselected number of levels to check sub-aggregates regarding boundaries, update and rebuild the pyramid before proceeding to the next upper level as part of each iteration of weight aggregation (Paragraph 159, Lines 6-10);

Brandt teaches limitation of claim 11, the method including the further step of detecting sharp transitions in pixels in the image (Paragraph 164, Lines 18-21);

Brandt teaches limitation of claim 12, the method including the further step of establishing a threshold to determine edge pixels in the image (Paragraph 165, Lines 1-5);

Brandt teaches limitation of claim 13, the method including the further step of applying edge tracing by best fitting line segments of aggregates to determined edge pixels (Paragraph 165, Lines 5-8);

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Brandt teaches limitation of claim 14, the method including the further step of producing a polygonal approximation of an aggregate's boundary (Paragraph 165, Lines 8-9);

Brandt teaches limitation of claim 15, the method including the further step of comparing the properties of neighboring aggregates (Paragraph 129, Lines 13-15);

Brandt teaches limitation of claim 16, the method including the further step of modifying weights to control intensity contrast between aggregates during recursive coarsening (Paragraph 139, Lines 3-5);

Brandt teaches limitation of claim 17, the method including the further step of determining variance of an aggregate relative to a neighboring aggregate (Paragraph 129, Lines 13-15);

Brandt teaches limitation of claim 18, the method according including the further step of determining multiscale variance of an aggregate to detect its texture (Paragraph 143, Lines 1-2);

Brandt teaches limitation of claim 19, the method including the further step of determining average variance at finer scales to determine a relationship between aggregates Paragraph 143, Lines 5-6);

Brandt teaches limitation of apparatus claims 20-38, corresponding to method claims 1-19 above (Paragraph 179).